

Marc J. Kuchner

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Employment and Education

Astrophysicist, GS 14, Goddard Space Flight Center, 2005–
Hubble Fellow, Russell Fellow, and Council of Science and Technology Fellow,
Princeton University, 2003–2005
Michelson Postdoctoral Fellow, Harvard-Smithsonian Center for Astrophysics, 2000–2003
Ph. D. Astronomy with a Minor in Physics, Caltech, Thesis *Exozodiacal Dust*
Advisor: Prof. Michael E. Brown, 2000
A. B. Physics, Astronomy and Astrophysics with Honors, Harvard University, 1994

Experience and Awards

Gemini/Near Infrared Coronagraphic Imager(NICI) Campaign Science Team, 2005
Subaru HiCiao Adaptive Optics Instrument Preliminary Design Review Panelist, 2005
Session Chair, STSCI Nearby Resolved Debris Disks Workshop, 2005
Science Advisor, Boston Museum of Science Planetarium Show, “Far Far
Away: The Worlds of Star Wars,” 2005
Organizer, Exoplanets Seminar Series, GSFC, 2005–
CorSpec TPF-C Instrument Concept Study Team, 2005
CorCam TPF-C Instrument Concept Study Team, 2005
Mag30Cam TPF-C Instrument Concept Study Team, 2005
Terrestrial Planet Finder Coronagraph Science & Technology Definition Team, 2005–2006
Chair, Committee on Circumstellar Disks
Scientific Organizer, Aspen Winter Conference on Planet Formation, 2005
NASA TPF/SSO Review Panelist, 2004, 2005
Organizer, Princeton Conference on General Astrophysics with TPF, 2004
<http://astro.princeton.edu/~mkuchner/ancillarysci.html>
Terrestrial Planet Finder (TPF) Science Working Group, 2002–2004
Chair, Committee on General Astrophysics and Comparative Planetology
Northrop Grumman Space Technology TPF Science Advisory Team, 2003–

Space Infrared Interferometric Telescope (SPIRIT) Science Team, 2003–
 Founder, Astrobiology Seminar Series, Princeton University, 2003
 Aspen Gemini Future Instrumentation Workshop: U.S. Delegate, 2003
 Eclipse Coronagraph Science Team, 2002–
 Fourier-Kelvin Space Interferometer (FKSI) Science Team, 2002–
 Princeton Extra-Solar Planets Advanced Mission Concepts Team, 2002
 Harvard-Smithsonian CfA Giant Segmented Mirror Telescope Committee, 2002
 Chair, Extrasolar Planets Session, AAS Division of Planetary Sciences Meetings, 2001,2002
 Ball Aerospace TPF Architecture Team, 2001
 Founder, Planet Formation Discussion Group, Harvard-Smithsonian CfA, 2001
 Solar System Dust Panel, Planetary Science Decadal Survey, 2001

Teaching

Advisor, University of Maryland Physics Department Ph. D. Student: Chris Stark, 2005–
 Goddard NRC Postdoctoral Fellow: Aki Roberge, 2005–
 Princeton Undergraduate Junior Paper: Daniel Miller, 2003
 Harvard Undergraduate Senior Thesis: Sean Moran, 2002
 Harvard REU Summer Student: Joannah Metz, 2002
 Thesis Committee, SAO Predoctoral Student: Tommy Grav, 2002
 Lecturer in Astronomy, Rio Hondo College, 1996

Grants

Co-I, *Spitzer* Grant, *Follow-up Study of Unusual White Dwarfs: Planets, Disks, and Deep 8 Micron Deficits* (\$72 K), 2005
 PI, *Spitzer* Grant, *Survey for Planets and Exozodiacal Dust Around White Dwarfs* (\$57 K), 2004
 Co-I, NASA Origins Grant, *Spectra and Biomarkers of Extrasolar Planets* (\$100 K), 2003–2005
 Science PI, Keck Interferometer Nuller Commissioning Science Team, *Circumstellar Disk Detection with the Keck Nuller* (\$210 K), 2003–2004
 Co-I, Keck Interferometer 2-Micron Commissioning Science Team, *Resolving Young Stellar Objects on Sub-AU Scales* (\$110 K), 2002–2003

Publications in Refereed Journals

“The Orbit and Occultations of KH 15D” by J.N. Winn, C.M. Hamilton, W.J. Herbst, J.L. Hoffman, M.J. Holman, J.A. Johnson and M.J. Kuchner submitted to the *Astrophysical Journal*

“Extrasolar Carbon Planets” by M. J. Kuchner and S. Seager, submitted to the *Astrophysical Journal Letters*, (astro-ph/0504214)

“A Unified View of Coronagraph Image Masks” by M. J. Kuchner, submitted to the *Astrophysical Journal*.

“Modeling Exozodiacal Dust Detection with the Keck Interferometer” by M. J. Kuchner and E. Serabyn, submitted to the *Astrophysical Journal*.

“The Mystery Deepens: Spitzer Observations of Cool White Dwarfs” by M. Kilic, T. von Hippel, F. Mullally, W. T. Reach, M. J. Kuchner, D. E. Winget, A. Burrows, and D. Saumon, to appear in the *Astrophysical Journal*

“The Dust Cloud Around the White Dwarf G29-39” by W. T. Reach, M. J. Kuchner, T. von Hippel, A. Burrows, F. Mullally, M. Kilic, and D. E. Winget, *Astrophysical Journal Letters*, Vol. 635, pg. 161, (2005).

“Eighth-Order Image Masks for Terrestrial Planet Finding” by M. J. Kuchner, J. Crepp, and J. Ge, *Astrophysical Journal*, Vol. 628, pg. 466, (2005).

“The Near-Infrared Size-Luminosity Relations for Herbig Ae/Be Disks” by J. D. Monnier et al. 2004, *Astrophysical Journal*, Vol. 624, pg. 832, (2005).

“The Dynamical Influence of a Planet at Semimajor Axis 3.4 AU on the Dust Around ϵ Eridani” by S. M. Moran, M. J. Kuchner and M. J. Holman, *Astrophysical Journal*, Vol. 612, pg. 1163, (2004).

“A Minimum-Mass Extrasolar Nebula” by M. J. Kuchner, *Astrophysical Journal*, Vol. 612, pg. 1147, (2004).

“Using Notch Filter Masks for High Contrast Imaging of Extrasolar Planets” by J. H. Debes, J. Ge, M. J. Kuchner and M. Rogosky, *Astrophysical Journal*, Vol. 608, pg. 1095, (2004).

“Detection of Close-In Extrasolar Giant Planets Using the Fourier-Kelvin Stellar Interferometer” by W. C. Danchi, D. Deming, M. J. Kuchner and S. Seager, *Astrophysical Journal Letters*, Vol. 597, pg. L57 (2003).

“Volatile-Rich Earth-Mass Planets in the Habitable Zone” by M. J. Kuchner, *Astrophysical Journal Letters*, Vol. 596, pg. L105 (2003).

“Notch Filter Masks: Practical Image Masks for Planet-Finding Coronagraphs” by M. J. Kuchner and D. N. Spergel, *Astrophysical Journal*, Vol. 594, pg. 617, (2003).

“The Geometry of Resonant Signatures in Debris Disks with Planets” by M. J. Kuchner and M. J. Holman, *Astrophysical Journal*, Vol. 588, pg. 1110, (2003).

“Halting Planet Migration in the Evacuated Centers of Protoplanetary Disks” by M. J. Kuchner and M. Lecar, *Astrophysical Journal Letters*, Vol. 574, pg. L87 (2002).

“Long-Term Dynamics and the Orbital Inclinations of the Classical Kuiper Belt Objects” by M. J. Kuchner, M. E. Brown, and M. Holman, *Astronomical Journal*, Vol. 124, pg. 1221 (2002).

“Structure in the Dusty Debris Around Vega” by D. J. Wilner, M. J. Holman, M. J. Kuchner, and P. T. P. Ho, *Astrophysical Journal Letters*, Vol. 569, pg. 115 (2002)

“A Coronagraph with a Band-Limited Mask for Finding Terrestrial Planets” by M. J. Kuchner and W. Traub, *Astrophysical Journal*, Vol. 570, pg. 900 (2002).

“Ground-Based Coronagraphy with High Order Adaptive Optics” by A. Sivaramakrishnan, C. D. Koresko, R. B. Makidon, T. Berkefeld, and M. J. Kuchner, *Astrophysical Journal*, Vol. 552, pg. 397 (2001).

“Interferometric Detection of Pulsations of the Cepheid ζ Geminorum” by B. F. Lane, M. J. Kuchner, A. F. Boden, M. Creech-Eakman and S. R. Kulkarni, *Nature*, Vol. 407, pg. 485 (2000).

“A Search for Exozodiacal Dust and Faint Companions around Sirius, Procyon, and Altair with the NICMOS Coronagraph” by M. J. Kuchner and M. E. Brown, *Publications of the Astronomical Society of the Pacific*, Vol. 112, pg. 827 (2000).

“A Search for Resonant Structures in the Zodiacal Cloud with COBE DIRBE: The Mars Wake and Jupiter’s Trojan Clouds” by M. J. Kuchner, W. T. Reach and M. E. Brown, *Icarus*, Vol. 145, pg. 44 (2000).

“The Visual Orbit of 64 Piscum” by A. Boden et al. *Astrophysical Journal*, Vol. 527, pg. 360 (1999).

“The Energetic Afterglow of the Gamma-Ray Burst of 14 December 1997” by A. N. Ramaprakash et al., *Nature*, Vol. 393, pg. 43 (1998).

“Keck Speckle Imaging of the White Dwarf G29-38: No Brown Dwarf Companion Detected” by M. J. Kuchner, C. D. Koresko, and M. E. Brown, *Astrophysical Journal Letters*, Vol. 508, pg. L81 (1998).

“An 11.6 Micron Keck Search For Exo-Zodiacal Dust” by M. J. Kuchner, M. E. Brown and C. D. Koresko, *Publications of the Astronomical Society of the Pacific*, Vol. 110, pg. 1336 (1998).

“Evidence for Ni-Co-Fe decay in Type Ia Supernovae” by M. J. Kuchner, R. P. Kirshner, P. A. Pinto, and B. Leibundgut, *Astrophysical Journal Letters*, Vol. 426, pg. L89 (1994).

Invited Review Papers

“General Astrophysics with the Optical Terrestrial Planet Finder Mission” K. Stapelfeldt, C. Beichman, and M. Kuchner, *New Astronomy* Vol. 49, pg. 396, (2005)

“Planetary Perturbors in Debris Disks” by M. J. Kuchner, *Earth, Moon and Planets: First Decadal Review of the Kuiper Belt* eds. J. Davies and L. Barrera, (2003)

“Terrestrial Planet Finding with a Visible Light Coronagraph” by M. J. Kuchner and D. N. Spergel, *Scientific Frontiers in Research on Extrasolar Planets*, ASP Conference Series, Vol. 294, pg. 603, eds. D. Deming and S. Seager, astro-ph/0305522, (2003).

“Keck Interferometer Nuller Shared-Risk Science Program” by M. J. Kuchner, *Hunting for Planets: Ground-based European Nulling Interferometry Experiment Workshop*, <http://www.strw.leidenuniv.nl/~genie/abstracts/kuchner.html>, (2002).

Invited Talks

Winter School in Planetary Atmospheres, Grenoble, 1/06
 University of Maryland, Department of Astronomy, Seminar 12/05
 George Washington University, Department of Physics, Colloquium 11/05
 University of Maryland, Department of Astronomy, Colloquium 11/05
 Goddard Space Flight Center, Astrobiology Seminar, 11/05
 Amazing Light: A Symposium in Honor of Charles Townes, 10/05
 University of Hawaii, Colloquium, 9/05
 University of Kyoto Dept. of Physics, Seminar, 5/05
 Early Earth Meeting, Makuhari, Japan, 5/05
 National Astronomical Observatory of Japan, Colloquium, 5/05
 University of Tokyo, Tokyo Area Planet Formation Seminar, 5/05
 Space Telescope Science Institute, Colloquium, 3/05
 Space Telescope Science Institute, Seminar, 12/04
 University of Michigan, Department of Astronomy, Colloquium, 12/04
 Penn State University, Department of Astronomy and Astrophysics, Colloquium, 10/04
 University of Florida, Department of Astronomy, Colloquium, 10/04
 University of Delaware, Physics Colloquium, 5/04
 University of Toronto, Department of Astronomy and Astrophysics, Colloquium, 5/04
 American Museum of Natural History, Astrophysics Seminar, 5/04
 Goddard Space Flight Center, LASP Division Seminar, 4/04
 Kavli Institute of Theoretical Physics, Planet Formation Conference, 3/04
 University of Texas at Austin, Department of Astronomy, Colloquium, 3/04
 Institute for Advanced Study, Planet Formation Working Group Seminar, 3/04
 Coronagraphic Methods for the Detection of Terrestrial Planets, Lorentz Center Workshop, 2/04
 University of Pennsylvania, Department of Astronomy, Colloquium, 11/03
 Stony Brook University, Department of Physics and Astronomy, Seminar, 10/03
 Maryland Astrophysics Conference: The Search for Other Worlds, 10/03
 Princeton University, Department of Astrophysical Sciences, Colloquium, 9/03
 International Astronomical Union General Assembly: Star Formation at High Angular Resolution, 8/03
 University of Michigan, Department of Astronomy, Colloquium, 3/03

University of Toronto, Department of Astronomy and Astrophysics, Colloquium, 2/03
 Carnegie Institution of Washington, Dept. of Terrestrial Magnetism, Colloquium, 2/03
 Penn State University, Department of Astronomy and Astrophysics, Colloquium, 12/02
 Dartmouth University, Physics Colloquium, 4/02
 Lunar and Planetary Institute, Seminar, 3/02
 University of Arizona, Department of Astronomy, Seminar, 3/00

Selected Conference Proceeding

“A Spectroscopic Search For Massive Thorne-Żytkow Objects” by M. J. Kuchner, D. Vakil, V. V. Smith, D. L. Lambert, B. Plez, and E. S. Phinney, *Stellar Collisions, Mergers, and Their Consequences*, ed. M. Shara, ASP Conference Series, Vol. 263, pg. 131 (2000).

Popular Science Article

“Interplanetary matter” by M. J. Kuchner in *The McGraw-Hill Encyclopedia of Science & Technology* (New York: McGraw-Hill) (2000).

Selected Press Coverage

Discover Magazine, “Planetary Peculiarities” 5/2005
 Iran Daily, “Distant Planets Could be Made of Diamond” 4/17/2005
 NPR Interview, Morning Edition, “The Race To Capture Extrasolar Planets” 3/2005
 American Museum of Natural History Science Bulletin “Diamond-Studded Exoplanets”
 2/14/2005
 IMAX Tycho Brahe Planetarium, “Exoplanetar med kul pa” 2/11/05
 Sky and Telescope Magazine, “A Flurry of Exoplanet Discoveries” 2/11//2005
 www.spacedaily.com “In the Stars: Odd Stars, Odder Planets” 2/10/2005
 Wired News, “Star Wants Out of Milky Way” 2/9/2005
 Astrobiology Magazine, “Carbon World” 2/8/ 2005
 News@Nature.com, “Distant Planets Could Be Made of Diamond” 2/2005
 Space.com, “Diamond Planets: Rich Possibilities for Other Worlds” 2/8/2005
 National Geographic News, “Diamond Planets Hint at Dazzling Promise of Other Worlds”
 2/2005
 comment in Science Now, “Coming Soon: A New Solar System” 8/12/2004
 comment in Science Magazine, “NASA Backs Two Missions to Spot Promising Planets”
 4/23/2005
 Vega model featured in Harvard Magazine, “A Gods Eye View of Space” 3/2004
 Sky and Telescope Magazine, “Finding Waterworld” 9/2003
 Boston Museum of Science: Current Science and Technology Center, “Marc Kuchner and

the TPF” 2003–

Science News, “Dusty Doings” 5/4/2002

Space.com, “New Era Dawns in Search for Other Worlds” 1/23/2002

Sky and Telescope, “Vega’s Clumpy Dust May Reveal Hidden Planet” 1/10/2002

SpaceRef.ca “Structure in Dust Around Vega May Be Signature of Planet” 1/9/2002